

LOW OBSERVABLE VIVALDI ANTENNA ARRAY FOR ELECTRONIC WARFARE APPLICATIONS

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Vivaldi antennas have been widely used in phased array for aerospace platforms due to high gain, wide bandwidth and large scan angles. Further these antennae are end-fire radiating elements with low radar signatures. In this work, the main objective is to design a wideband Vivaldi antenna (2-18 GHz) with high gain and low radar cross-section (RCS) without disturbing other radiation parameters such as VSWR and gain. Firstly, a single Vivaldi antenna with proximity coupled microstrip feed has been designed to achieve the reflection coefficient below -10 dB for the frequency range of 2-18 GHz and the antenna gain greater than 5 dBi. The monostatic and bistatic RCS of the designed Vivaldi antenna was simulated for normal/oblique angles of incidence in vertical/horizontal polarizations. Further, the slots were introduced into the antenna structure for reducing the antenna RCS. It is shown that RCS reduction of 4-5 dB has been achieved without any degradation in the antenna performance. Next, a 4-element low RCS Vivaldi antenna array has been designed to achieve gain of 15 dBi. The inter-element spacing has been kept greater than half-wavelength to avoid mutual coupling. Such low observable Vivaldi array have Electronic Warfare applications.

Keywords: *Vivaldi antenna, array, gain, VSWR, reflection coefficient, monostatic/bistatic RCS*
